REMARKS

Claims 1 to 10 are pending in the present application. Claims 5 and 8 have been rejected as indefinite under 35 U.S.C. § 112, second paragraph. Accordingly, existing claims 1 to 10 are herewith canceled and new claims submitted. The amendments add no new matter.

The examiner rejected claims 1 to 10 under 35 U.S.C. 102 as being anticipated by, or in the alternative under 35 U.S.C. § 103(a) as obvious over U.S. Patent Number 5,853,877 to Shibuta. Applicants respectfully traverse this rejection.

A reference must teach or suggest all elements of a claim to anticipate the claim, or to render the claim obvious. Applicants disclose and claim a method for, *inter alia*, a multiwall carbon nanotube in which only the outer wall is oxidized and a process for oxidizing only the outer wall of a multiwall carbon nanotube. Such a multiwall carbon nanotube has at least one inner carbon nanotube which is surrounded coaxially by an outer carbon nanotube. Shibuta fails to teach or suggest at least each of the claimed features.

There are different types of nanotubes, namely carbon nanotubes, carbon microfibres and carbon fibres. Carbon fibres, e.g., are hollow or solid thin fibres having an outer diameter of 0.1 to 10 nanometers and high electric conductivity. (Shibuta Col. 1, lines 59-65). Shibuta also discloses very thin carbon fibres (hereinafter referred to as carbon microfibres) as hollow fibres having a hollow core. Due to the diameter on the order of nanometers, carbon microfibres are also called carbon fibrils or nanotubes (Shibuta Col. 2, lines 11-16). Due to the problem addressed by Shibute, namely to provide an electrically conductive transparent carbon microfiber film, these nanotubes must be hollow, with a hollow core and, in contrast to the present invention, single walled.

Applicant respectfully points out that the Examiner incorrectly refers to Shibuta's discussion of carbon fibrils as meaning that such fibrils are multi-walled carbon nanotubes. In contrast, such carbon fibrils are simply "very thin carbon fibers . . . [that are] hollow fibers having a hollow core. . . also called nanotubes or carbon fibrils." (Shibuta, Col. 2, lines 11-16.) Thus, in focusing solely on single-wall nanotubes, Shibuta fails to disclose the technical "multiwall" feature of the present invention either explicitly or implicitly. Thus, a carbon

nanotube wherein only the outer wall is oxidized, and the method for manufacture of same, is novel over Shibuta.

Shibuta also discloses a method for disentangling hollow carbon microfibres and to the dispersion of hollow carbon microfibres to form transparent electrically conductive films. The method for disentangling the microfibres comprises the treatment with a strong acid containing sulfur in addition to an oxidizing agent.

In contrast, the object of the present invention is to provide nanocircuits wherein a crosswise construction of such nanocircuits, without an electric short circuit between the crossing carbon nanotubes, is possible.

This object is achieved by a multiwall carbon nanotube having an outer wall and at least one innerwall, wherein only the outer wall is oxidized and the inner wall or walls are not oxidized. Thus, in a manner analogous to a rubber-sheathed electric wire, a nanotube which is especially suitable for conduction of electricity in nanocircuits is created.

This object is further achieved by a process for oxidizing only the outer wall of a multiwall carbon nanotube, comprising, *inter alia* providing a multiwall carbon nanotube, subjecting the multiwall carbon nanotube to oxidation, and isolating the multiwall carbon nanotube that has been treated in this manner.

Shibuta fails to address the technical problem faced by the present invention and, as a result, also fails to address the novel solution of the problem. Thus, there is no teaching or suggestion that would lead one skilled in the art to believe it possible to provide nanocircuits wherein a crosswise construction of such nanocircuits, without an electric short circuit between the crossing carbon nanotubes by using a multiwall nanotube wherein only the outer wall is oxidized. As a result, the skilled artisan would not even consider the teachings of Shibuta when facing the problem of the present invention.

The Examiner further alleges that it would have been obvious to a person of ordinary skill in the art to oxidize only the outer wall of a multiwall nanotube using the process as applied to hollow carbon microfibres disclosed by Shibuta. However, Shibuta fails to discuss oxidation of only the outer wall of a multiwall nanotube as disclosed by the present invention. Shibuta only discusses surface modification of a carbon microfibre, i.e., a hollow fibre having a hollow core. Nor is there any hint or suggestion in Shibuta that one ordinarily skilled in the

art would be able to oxidize only the outer wall of a multiwall nanotube. Shibuta fails to teach or suggest the device and method of the current invention.

Accordingly, Applicant respectfully requests that the Examiner withdraw the rejection of claims 1-10 under 35 U.S.C. 102(b) as anticipated. Applicant further respectfully requests the Examiner withdraw the alternative rejection of Claims 1-10 under 35 U.S.C. § 103(a) as obvious.

In view of Applicant's amendments and remarks, the claims are believed to be in condition for allowance. Reconsideration, withdrawal of the rejections, and passage of the case to issue is respectfully requested. If any fees not accounted for above are due in connection with the filing of this paper, please charge the fees to our Deposit Account No. 02-3732.

Respectfully submitted,

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